भारतीय मानक
Indian Standard

IS 17917 : 2022

सामान्य औद्योगिक अनुप्रयोगों के लिए दाब सुग्राही आसंजक फिल्में — विशिष्टि

Pressure Sensitive Adhesive Films for General Industrial Applications — Specification

ICS 83.180

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भारतीय मानक ब्यूरो
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Plastics Sectional Committee, PCD 12

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Plastics Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

Pressure sensitive adhesives are manufactured in large quantities in India. These adhesive films are made of pressure sensitive adhesive layer and need only pressure for making bond on any clean surfaces. The applications of these laminating adhesive films are bonding of industrial foam to other metal and plastic substrates for automotive interior and other industrial applications. The other application for these adhesive films are durable and long-term bonding of graphic, metal and plastic nameplates and overlays to various substrates for industrial applications.

This standard will cover the general requirements, test methods and packaging and sampling of pressure sensitive adhesive films.

The composition of the Committee responsible for the formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

PRESSURE SENSITIVE ADHESIVE FILMS FOR GENERAL INDUSTRIAL APPLICATIONS — SPECIFICATION

1 SCOPE

1.1 This standard prescribes the requirements and methods of sampling and test for adhesive film which is a layer of acrylic or rubber-based pressure sensitive adhesive film coated on special paper or film release liner.

1.2 For application, the tape is simply pressed adhesive side down to the intended surface and the liner is peeled off.

1.3 This Standard does not cover medical and other specialized applications like UV cured adhesive films.

2 REFERENCES

The following standards contain provisions, which through reference in this text constitute the provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most editions of the standards indicated below.

IS/ Other Publications	*Title*
IS 3434 : 1984	Glossary of terms for adhesive and pressure sensitive adhesive tapes *(first revision)*
IS 6911 : 1972	Stainless steel plate sheet and strip
IS 8402 : 1987	Methods of sampling and test for pressure sensitive adhesive tapes *(first revision)*
IS 3687 : 1987	Specification for pressure sensitive adhesive cloth tapes
IS 13262 : 1992	Pressure sensitive adhesive tapes with plastic base specification
IS 7809 (Part 2) : 1977	Specification of pressure sensitive adhesives for electrical purposes
IS 16197 (Part 4) : 2014 / IEC 62321-4 : 2013	Determination of certain substances in electrotechnical products: Part 4 Mercury in polymers, metals and electronics by CV - AAS, CV - AFS, ICP - OES and ICP - MS
IS 16197 (Part 5) : 2014 / IEC 62321-5 : 2013	Determination of certain substances in electrotechnical products: Part 5 Cadmium, lead and chromium in polymers and electronics and cadmium and lead in metals by AAS, AFS, ICP - OES and ICP - MS
IS 16197 (Part 6) : 2018 / IEC 62321-6 : 2015	Determination of certain substances in electrotechnical products : Part 6 Polybrominated biphenyls and polybrominated diphenyl ethers in polymers by Gas Chromatography — Mass Spectrometry (GC-MS)

IS/ Other Publications	*Title*
IS 16197 (Part 7/ Sec 2) : 2020 / IEC 62321-7-2 : 2017	Determination of certain substances in electrotechnical products : Part 7 Hexavalent Chromium, Section 2 Determination of hexavalent chromium [Cr(VI)] in polymers and electronics by colorimetric method
IS 16197 (Part 8) : 2020 / IEC 62321-8 : 2017	Determination of certain substances in electrotechnical products : Part 8 Phthalates in polymers by Gas Chromatography — Mass Spectrometry (GC-MS), Gas Chromatography — Mass Spectrometry Using a Pyrolyzer / Thermal Desorption Accessory (Py-TD-GC-MS)
ISO 4587 : 2003	Adhesives — Determination of tensile lap-shear strength of rigid-to-rigid bonded assemblies
ISO 21675 : 2019	Water quality — Determination of perfluoroalkyl and polyfluoroalkyl substances (PFAS) in water — Method using solid phase extraction and liquid chromatography-tandem mass spectrometry (LC-MS/MS)
ISO 29862 : 2018	Self-adhesive tapes — Determination of peel adhesion properties
ISO 29863 : 2018	Self-adhesive tapes — Measurement of static shear adhesion

3 TERMINOLOGY

3.1 For the purpose of this standard, the definitions given in IS 3434 shall apply. In addition to those, following definitions shall apply:

3.2 Adhesive Film — Adhesive film is a layer of adhesive, supported on a removable backing (release liner).

3.3 Adhesive Tape — Adhesive tapes are rolls of pressure-sensitive adhesive film pre-applied to a special release liner.

3.4 Laminating Adhesive — Adhesive film that can be laminated using lamination technique on the intended substrate.

3.5 Release Liner — It is coated on one or both sides with a release agent, which provides a release effect against any type of a sticky material such as an adhesive.

3.6 Durable Graphic — Durable graphics are category of durable labels that are dimensionally stable and perform for many years.

3.7 Overlay — Overlays are category of durable labels that usually has multiple layers, which are dimensionally stable and perform for many years.

4 TYPES

4.1 There shall be two types of adhesive film as follows:

- **a)** *Type* 1 — Low temperature resistance (up to 80ºC) adhesive film product category.
- b) *Type* 2 — High temperature resistance (up to 200ºC) adhesive film product category.

These two types of adhesive films are made either with rubber or acrylic based pressure sensitive adhesive. Type-1 category is for general purpose application where temperature resistance requirement is up to 80ºC whereas Type -2 category is for specific applications where temperature resistance requirement is up to 200ºC.

5 REQUIREMENTS

The adhesive film is made up of pressure sensitive adhesive layer which is coated uniformly on one side of paper or film release liner. This consists of pure uniform layer of adhesive without any carrier in between. The paper or film release liner will have release coating on both the sides. In a wound roll, both surfaces of the adhesive film are contacting the two surfaces of a release liner, therefore both the surfaces of the release liner need to be release coated for preventing it from sticking to itself. Release liner shall have differential release coat on both the sides. Differential release is essential when working with adhesive film. The liners for these adhesive films typically have a coating with a tight release value on one side and a coating with an easy release value on the other side. This liner construction enables the adhesive film to easily be rolled, unrolled and applied without the adhesive confusing or sticking to the wrong side of the differential release liner. Adhesive confusion occurs when the double-sided adhesive tape does not "recognize" from which side to release first. Instead, the tape jumps during the unwinding process from one release liner surface to the other. As a result, the tape is usually damaged. Easy release enables the adhesive layer to separate from the roll and the tight release side is detached from the adhesive film after application of the adhesive on the target surface. This product requires no further moisture, heat or other special preparation prior to application. When product is applied on the clean substrate with adhesive side down, simply apply the pressure then peel off the liner. Liner shall come out smoothly and adhesive layer shall be laminated on the intended substrate. These adhesive films include acrylate and rubber-based pressure sensitive adhesives with different coat weights.

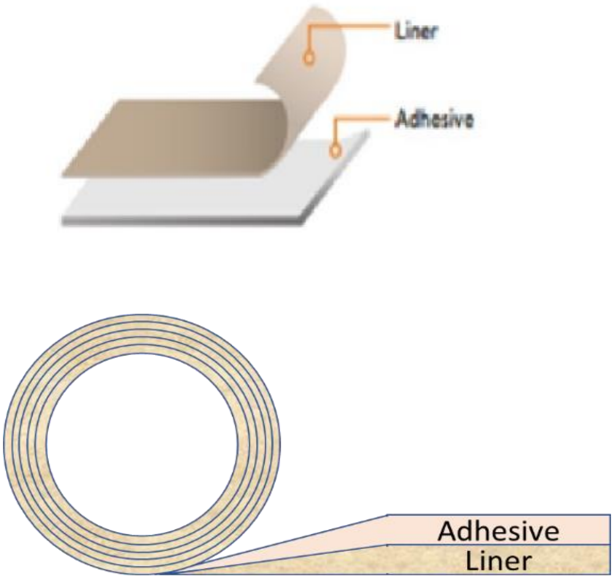

FIG. 1 ADHESIVE FILM

The rolls shall be wound uniformly and evenly on cores so that each succeeding turn coincides with the one below it. Each roll of tape shall be reasonably free from overlapping, depressions and distortion and shall unroll without off-setting of the adhesive mass.

5.1 Colour

Colour of the material shall be either transparent, translucent, white or black.

5.2 Printing

There shall be no printing on adhesive film. The printing shall be done on outer side of liner, if required and shall be legible and shall not transfer to the adhesive side of the adjacent turn.

5.3 Cores

All tapes shall be normally wound on cores of internal diameters 75.0 ± 1.5 mm, 50.0 ± 0.5 mm and shall have sufficient rigidity to prevent the distortion of the roll under normal conditions of transportation and use.

5.4 Width

The width of the tape shall be between 5 mm to 1 500 mm. The width shall be determined by taking five determinations at random in a length of not less than one meter of tape from each sample roll. None of the five observations for width measured, shall fall outside the tolerance limit of ± 1.0 mm.

5.5 Length

The length of the roll shall be as agreed between the purchaser and the supplier and shall not vary by more than one percent from the specified length, when determined by unrolling the roll in a suitable winding machine fitted with a measuring tape capable of measuring 0.1 metre.

5.6 Splices

A roll of tape shall not have more than one splice in 20 m length and not more than 2 in a 50 m length roll. However, if length of the roll is more than 50 m than maximum 3 splices are allowed. The splices shall be so made so as not to separate while unwinding the roll.

5.7 Thickness of Adhesive Film

The thickness of the adhesive film shall be tested after laminating the adhesive film on polyester film backing without any bubbles. Consider adhesive film as ‘A’ and polyester film backing as a ‘B’. Thickness of adhesive film laminated with polyester film backing ‘A+B’ shall be measured and thickness of polyester film backing ‘B’ shall be measured separately. Now adhesive film thickness can be achieved by subtracting ‘A+B’ to ‘B’ values (A+ B - B = A). Test shall be conducted as prescribed in IS 7809 (Part 2) and shall not be less than 0.025 mm with ± 10 percent tolerance.

5.8 Adhesion to Metal

The adhesion strength of the tape when tested as prescribed in **5** and **13** of IS 8402 shall not be less than 4 N per 10 mm width.

5.9 Static Shear Strength at 23°C and 70°C

5.9.1 *At 23°C*

The static shear strength of the tape when tested at 23°C as prescribed in ISO 29863 shall not be less than 2 000 min for Type -1 and 10 000 min for Type-2 product category for 25.4 x 25.4 mm^2 (1x1 square inch) sample size with 1 000 g load conditions.

5.9.2 *At 70°C*

The static shear strength of the tape when tested as prescribed in ISO 29863 shall not be less than 1 000 min for Type -1 and shall not be less than 10 000 min for Type-2 product category when tested at 70°C temperature with 25.4 x 25.4 mm^2 (1x1 square inch) sample size with 500 g load conditions.

5.10 Tensile Overlap Shear Strength

The tensile overlap shear strength of the tape when tested as prescribed in ISO 4587 shall not be less than 38 750 kg/m^2 (25 kg/inch^2).

5.11 Liner Release Strength

The adhesion strength of liner to the adhesive film when tested as prescribed in ISO 29862 shall not be more than 0.5 N per 10 mm width.

5.12 Temperature Resistance

5.12.1 *Type*-1

Laminate the tape sample to the polyester or aluminum foil backing material.

Laminated sample applied on metal surface is then exposed to 80ºC or less depending on the application requirements for 1 h, 4 h and 24 h.

5.12.2 *Type*-2

Laminate the tape sample to the aluminum foil backing material. Laminated sample applied on metal surface is then exposed to 200ºC or less depending on the application requirements for 1 h, 4 h and 24 h.

After exposure at required temperature for given time frame, sample shall be taken out at room temperature and observed for any kind of visual defects such as delamination, edge lifting, yellowing etc. Sample shall show no evidence of visual deterioration in the adhesive film as such. Also, adhesion test shall be performed. Peel adhesion performance shall not drop more than 10 percent from initial values when tested post temperature exposure.

5.13 Durability

The tape shall pass the test as prescribed in **12** of IS 8402.

5.14 Stability

The tape shall part neatly from the under layer and shall show no evidence of deterioration in the adhesive film and liner when observed visually so as to make the tape unfit for use when aged as prescribed in **14** of IS 8402. The adhesion to metal shall not decrease by more than 12 percent when determined by the method prescribed in **5** of IS 8402.

5.15 Storage Life / Shelf Life

The rolls when stored on their cut edges in original unopened containers at 27 ± 2ºC and 65 ± 5 percent relative humidity shall continue to comply with the requirements prescribed in **6** and **7** for a minimum period of one year from the date of manufacture.

5.16 Heavy Metal under Environment and Sustainability

Adhesive film shall meet the following requirements and guidelines for determining the maximum concentration level for lead, cadmium, hexavalent chromium and mercury and other hazardous elements when used for industrial applications. The parameters and limits are given below:

Sl No.	Requirement	Limit, *Max*	Test Method
(1)	(2)	(3)	(4)
i)	Mercury	Sum less than 100 mg/kg	IS 16197 (Part 4)
ii)	Lead		IS 16197 (Part 5)
iii)	Chromium (VI)		IS 16197 (Part 7/ Sec 2)
iv)	Cadmium		IS 16197 (Part 5)
v)	Flame-retardants	PBB less than or equal to 1 000 mg/kg PBDE less than or equal to 1 000 mg/kg	IS 16197 (Part 6)
vi)	Ortho-phthalates	1 00 ppm	IS 16197 (Part 8)
vii)	PFAS	0.025 mg/kg by weight for PFOA and its salt 1 mg/kg by weight in total for PFAS related compounds	ISO 21675
viii)	Biocides (if used)	Must be approved (refer Insecticide Act 1968 & Rules 1971)	

To ensure product compliance for appliance and electronics industry related end applications Annex A shall be followed.

6 PACKINGING AND MARKING

6.1 Packing

The rolls shall be packed inside polybags along with end cap attached with the roll and then it shall be packed in suitable containers so that they are adequately protected from damage in transportation and from deterioration due to climatic conditions and shall not adhere to each other or to the container.

6.2 Marking

Each container shall be marked legibly with the following information:

a) Name and type of the material;

b) Indication of source of manufacturer;

c) Month and year of manufacturing;

d) Length and width of the tape;

e) Batch number of manufactures

f) Directions for storage and use**,** if necessary; and

g) Any other statutory requirements.

6.3 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

7 SAMPLING AND CRITERIA FOR CONFORMITY

7.1 The scale of sampling shall be as prescribed in **3** of IS 8402.

7.2 Number of Tests

Tests for the determination of all the requirements of the specification given in **5** shall be performed on each of the individual sample rolls separately.

7.3 Criteria for Conformity

The lot shall be deemed as conforming, if the adhesive film meets the requirements given in the standard.

ANNEX- A

(*Clause* 5.16)

The material shall comply with the requirements given below to ensure product compliance for appliance and electronics industry related end applications, when tested with the methods specified in col (3):

Sl No. (1)	**Requirement** (2)	**Limit, *Max*** (3)	**Test method** (4)
i)	Cadmium(Cd), mg/kg	100	IS 16197 (Part 5)
ii)	Lead (Pb), mg/kg	1000	IS 16197 (Part 5)
iii)	Mercury (Hg), mg/kg	1000	IS 16197 (Part 4)
iv)	Hexavalent Chromium (Cr(VI))(Metal), µg/cm^2 Hexavalent Chromium (Cr(VI)) (Polymer), mg/kg	- 1000	IS 16197 (Part 7/ Sec 2)
v)	Sum of Polybrominated Biphenyls (PBBs), mg/kg	1000	IS 16197 (Part 6)
vi)	Monobromobiphenyl, mg/kg	-	
vii)	Dibromobiphenyl, mg/kg	-	
viii)	Tribromobiphenyl, mg/kg	-	
ix)	Tetrabromobiphenyl, mg/kg	-	
x)	Pentabromobiphenyl, mg/kg	-	
xi)	Hexabromobiphenyl, mg/kg	-	
xii)	Heptabromobiphenyl, mg/kg	-	
xiii)	Octabromobiphenyl, mg/kg	-	
xiv)	Nonabromobiphenyl, mg/kg	-	
xv)	Decabromobiphenyl, mg/kg	-	
xvi)	Sum of Polybrominated Diphenyl Ethers (PBDEs), mg/kg	1000	IS 16197 (Part 6)
xvii)	Monobromodiphenyl ether	-	
xviii)	Dibromodiphenyl ether, mg/kg	-	

Sl No. (1)	**Requirement** (2)	**Limit, *Max*** (3)	**Test method** (4)
xix)	Tribromodiphenyl ether, mg/kg	-	
xx)	Tetrabromodiphenyl ether, mg/kg	-	
xxi)	Pentabromodiphenyl ether, mg/kg	-	
xxii)	Hexabromodiphenyl ether, mg/kg	-	
xxiii)	Heptabromodiphenyl ether, mg/kg	-	
xxiv)	Octabromodiphenyl ether, mg/kg	-	
xxv)	Nonabromodiphenyl ether, mg/kg	-	
xxvi)	Decabromodiphenyl ether, mg/kg	-	
xxvii)	Dibutyl phthalate (DBP) , mg/kg	1000	IS 16197 (Part 8)
xxviii)	Butyl benzyl phthalate (BBP) , mg/kg	1000	IS 16197 (Part 8)
xxix)	Bis (2-ethylhexyl) phthalate (DEHP) , mg/kg	1000	IS 16197 (Part 8)
xxx)	Diisobutyl Phthalates (DIBP) , mg/kg	1000	IS 16197 (Part 8)

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Plastics Sectional Committee, PCD 12

Organization(s)	*Representative(s)*
Central Institute of Plastics Engineering & Technology (CIPET), Chennai	Prof (Dr) Shishir Sinha (***Chairman***) Dr S. N. Yadav Dr Smita Mohanty (*Alternate*)
All India Plastics Manufacturers Association (AIPMA), New Delhi	Shri Deepak Ballani
Central Pollution Control Board, New Delhi	Miss Divya Sinha Shri C. K. Dixit (*Alternate*)
Chemical and Petrochemical Manufactures Association (CPMA) New Delhi	Shri Mahinder Singh
Coca-Cola India Pvt Ltd, Gurugram	Shri Virendra Landge Shri Rajendra Dobriyal (*Alternate*)
Consumer Association of India (CONCERT), Chennai	Shri G.Santhanarajan Shri M. R. Krishnan (*Alternate*)
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Food Corporation of India (FCI), Delhi	Shri Rajagopal. A Shri A. K. U. B.Singh (*Alternate*)

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Indian Institute of Packaging (IIP), Mumbai	Dr Sanjay Chattopadhyay Dr Tanweer Alam (*Alternate*)
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Indian Pharmacopoeia Commission, Ghaziabad	Dr Jai Prakash Dr Manoj Kumar Pandey (*Alternate*)
Indian Plastic Institute (IPI), Mumbai	Shri V. B. Lall Shri Mihir Banerji (*Alternate*)
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ONGC Petro Additions Ltd (OPAL), Gujarat	Shri Vivek Mehta

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Plastindia Foundation, Mumbai	DR E. Sundaresan Shri Hiten Bheda (*Alternate*)
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Shri Shivam Dwivedi

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Panel for Preparing Standard on Adhesive Film

Organization	*Representative(s)*
3M India	SHRIMATI RUCHI PANDEY (***Convener***)
Ajit Industries	SHRI HARESH SHARMA SHRI AJIT GUPTA (*Alternate*)
SGS India	SHRI JAIPRAVEEN SHARMA
TUV Rheinland	SHRI RANBIR PAL SHRI JAIWARDHAN BHATI (*Alternate*)

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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